

about inquiries to find out whether the wire had been struck or not. No smoke appeared from the flash. There was a deep hissing noise, followed by the natural crash of the thunder some seconds afterwards.

"The hissing noise was probably the wire falling, as it was in many cases driven 2 or 3 inches into the earth. I was about 180 yards from the winch in the same direction as the wire, and about forty yards from directly under the wire to the left, looking from the winch.

"The balloon went away free, carrying the instruments, and was watched for several minutes, as it happened to pass through a clear portion of the sky where no clouds were at the time. It has not since been recovered.

"On investigation of the wire I found that near the winch, say about 250 yards from it, the wire became less tempered; in fact, it would stand bending quite well in the portions found near the winch. It was fused right off at the first wheel of the winch, and was undamaged at the drum of the winch.

"The weather was sultry; there had been some rain. The wind was light but squally, W.N.W. There had been no lightning previously.

"The following are some observations taken on the ground about an hour before the wire was struck:—

Dry bulb	...	...	...	...	18° C.
Wet bulb	...	...	...	...	15°·8 C.
Barometer	...	...	...	...	29·85

Wind, N.W. to W.N.W.

"Specimens of the wire enclosed."

It appears from the specimens of wire that the heat developed was sufficient to melt the tin but not to fuse the wire. If then we assume that the process is too rapid for loss of heat by conduction, we get for the limits between which the heat energy must lie  $6 \times 1400 \times 200 \times 0.11$  and  $6 \times 1400 \times 1300 \times 0.18$  in gram degree units, the wire weighing about 6 grams per metre, and the mean specific heat of steel from 0° C. to 1300° C. being taken to be 0.18.

In ergs the limits become  $7.12 \times 10^{12}$  and  $8.28 \times 10^{13}$ , or, assuming the height of the cloud to be 100 metres, the energy was sufficient to raise 73 kilograms, but not sufficient to raise 840 kilograms, to the cloud level.

The fact of the wire being less brittle in the lower portion points to a diminution of the energy developed, but no reasonable explanation of this is apparent unless it is due to an induction effect.

In the case of a similar discharge on April 11 of this year, the wire was completely fused from the balloon to the winch; the length of wire out was half a mile, and the height of the balloon 2000 feet. The balloon was in the clouds at the time. The discharge in this case also took place by a cross flash from cloud to balloon. An account of the occurrence is given in a paper by Colonel Capper, read before the Royal Meteorological Society in May.

E. GOLD.

Meteorological Office, 63 Victoria Street, London, S.W., August 19.

### The Origin of the Domestic Striped Tabby Cat.

In the Proceedings of the Zoological Society for February of this year I attempted to prove that English domestic cats are to be referred by their patterns to two distinct kinds, which were described as the blotched and striped tabbies; and in discussing the possible origin of these two cats, I set the blotched tabby aside as of unknown descent, and stated it as my conviction that the striped tabby was to be traced to the interbreeding of two well-known wild species, namely, the European wild cat (*Felis sylvestris*) and the so-called Egyptian or African wild cat (*Felis ocreata*). There were living at that time in the Zoological Gardens a male example of *F. sylvestris* from Scotland and a female example of *F. ocreata* from Uganda. The latter was captured as a kitten near Nairobi in March, 1906, and had never been put to a male. To test the truth of my belief that the progeny of these two species would resemble our domestic striped tabby, and also to discover if there was any foundation for the theory some authors had put forward previously that the blotched tabby was the result of such a cross, the two cats in question

were placed in the same cage this summer. They took to one another at once, and last week the female produced a litter of kittens resembling in every respect a typical striped tabby such as may be seen any day in the streets of London.

R. I. Pocock.

Zoological Society's Gardens, August 18.

### A Fossil Tsetse-fly in Colorado.

AMONG the interesting materials obtained this year in the Miocene shales of Florissant, Colorado, is a large "biting" fly, with a remarkably long and strong proboscis, very well preserved. A very superficial examination was sufficient to show that it was no ordinary Tabanid or Muscid, and it at once occurred to me that it was a tsetse-fly. Having no specimen of the latter at hand, I turned to the admirable coloured figures in the second report of the Wellcome Laboratories at Khartoum, and, as was expected, it matched so nearly that it might well go in *Glossina*. There is a slight difference in the venation which may or may not be of generic value, but if the insect is not a *Glossina* it is at least closely allied. Curiously, it is not new, for it appears to be the species described by Scudder in 1892 as *Paloestrus oligocenus*, a supposed new genus of *Cestridæ*. The new specimen, practically complete, and with the mouth-parts, shows that it has nothing to do with *Cestridæ*, and anyone who will refer to Scudder's figure will see how closely the venation resembles that of *Glossina*.

The specimen obtained this year was found by Mr. George N. Rohwer, a member of our party from the University of Colorado. It is an obvious suggestion, following some remarks lately published by Prof. Osborn, that the existence of such flies may have had something to do with the extinction of some of the Tertiary Mammalia of America.

T. D. A. COCKERELL.

University of Colorado.

### PHYSICS AND CHEMISTRY.

"ONE of the penalties of devotion to a progressive science is the constant feeling of being left behind." So says the president of Section B, in his address from the chair, at the recent meeting of the British Association; and although he adds that he does "not think there is any occasion for panic," yet the concluding portion of his address seems to indicate that something approaching fear accompanies the impression that the progress of science at the present time is almost too rapid. There were some other indications, also, at the meeting, that physics at the present time is mistrusted by some chemists, to an extent perhaps beyond ordinary and necessary caution.

With a great part of the address agreement is easy. The plea that chemists should continue chemists, and that accurate manipulation and careful experimenting should be strenuously cultivated, is so reasonable as to be almost trite: for who would have it otherwise? That an atomic theory of matter, which has proved so useful in the past, should be adhered to as a guide in the future is also a natural desire against which no physicist has a word to say. Indeed, very much the contrary: the atom of matter is as useful a conception as ever, and has become even more real and concrete owing to the actual counting and measuring of individual atoms by physicists. But that physicists and mathematicians should leave the atom alone, and refrain from discomposing examination into its probable internal structure, should cease to break it up and otherwise modify it by appropriate agencies, and should turn a blind eye to any spontaneous explosions of energy whenever they have the bad taste to occur; also that no element shall be discovered and named which has zero chemical affinity, or which cannot be obtained in weighable amounts—all that is surely more than Section B has any right to expect, nor do I suppose that it seriously makes such a demand.

But the worst of a pessimistic outcry about the over-rapid development of science is that it is taken up by the general public, one section of which is always hoping that what is unintelligible is really meaningless, and may be safely ridiculed or ignored. So it has happened that a strange sentence in Prof. Smithells's address, which I will quote directly, is made the text for a singular attack by a leading article writer in the *Times* of August 6 apparently against the Cambridge school of mathematical and experimental physicists, which for a long time now has been in the eyes of the world one of the scientific glories of this island.

The quotation is as follows:—

"There is never more cause for anxiety than when we see a mathematical theory awaiting the delivery of the confirmatory facts; and there is nothing more important for chemistry than the continual recruiting of that old guard which will be ever ready to stand to arms on the appearance of an eager theorist."

Now it is an old and recognised tradition that mathematical prediction of a fact to be subsequently confirmed by experiment is the highest achievement of science. The clearer the prediction, and the more rigorous the subsequent verification, the greater should be the joy among all those who wish for the advancement of natural knowledge.

That the theory should be completely intelligible to those comparatively ignorant of mathematics, until the fact has been arrived at experimentally, is not to be expected; and that a few should suppose that the prediction is only really forthcoming after the event—which is when they first hear of it—is also not unnatural. But the preparation of a theoretical niche for a fact, either just discovered or just on the verge of being discovered, is a piece of work involving the highest faculty of scientific insight; and it is to be hoped that the public are not going to be misled into a depreciation of the work of all except those who, very rightly, collect an assemblage of facts.

There is room for workers of all kinds towards the progress of science, and the encouragement and countenance of the public is one of the conditions; for often enough the difficulties of the work itself are more than discouraging, and if uncertainty as to its reception or appreciation by the contemporary human race is to be added, then it is to be feared that the discouragement may in some cases become complete. Such a catastrophe actually happened in the case of Thomas Young; but it was not the outcome of a meeting of the British Association for the Advancement of Science.

Probably the real intention of the president of Section B was to caution certain physical chemists, and perhaps to restrain or rebuke some of the Ostwald school in his own section; a matter well within his jurisdiction. Indeed, if he only wishes to express dislike at an attempted replacement of ordinary dynamics by a vaguer "energetics," he will find sympathisers among the physicists; as witness the following quotation from an article by the late G. F. FitzGerald in *NATURE* for March 12, 1896 (reproduced in his collection, "Scientific Writings," p. 387), with reference to an article by Prof. Ostwald called "Emancipation from Scientific Materialism." I must add, however, that FitzGerald was a keen admirer of the work of Prof. Ostwald in general, though in this particular doctrine, especially on its negative side, he did not consider that he was on a hopeful path. The quotation is as follows:—

"There are so many vague fallacies underlying it, that it would hardly be worth answering, only that there is considerable risk that others, chemists especially, may be carried away by the arguments of one whom they rightly value as a leader in their own

domain, when he descants positively about the realm of mechanics."

For the present purpose I need not enter upon a discussion of this matter: there is doubtless much that can be said on both sides. If the president of Section B had so expressed himself as to drive home this kind of caution among the members of his own section, without appearing to refer to better known and more immediately prominent subjects of debate, I should have said no word; and I desire it to be clearly understood that I am not now expressing any opinion on this subject. But, unfortunately, that is not how his address has been regarded from outside, nor is it the interpretation to which certain phrases, such as "chemistry of phantoms," "exuberance of mathematical speculation," readily lend themselves. It is in the hope that damaging misunderstanding may be avoided that this article is written. OLIVER LODGE.

### A TRIAD OF SPORTING BOOKS.<sup>1</sup>

TO the author of the volume standing first on the list given below, the wilderness from time to time calls with such persistence and force that to hear is practically to obey; and, whether to shoot wild goats in the Taurus, to collect 'cultures' and eagles' eggs in Asia Minor or Spain, or to track the lordly moose and the branching-antlered caribou in the wilds of the far North-West, Mr. Selous returns year after year with unabated zest to the roving life of his earlier South African days. That the public benefits from this restless disposition can scarcely be denied, for although he cannot be credited with anything special in the matter of literary style, the author of "Recent Hunting Trips" writes with that freshness and *verve* that almost transports the reader to the very scenes of his adventures and triumphs. Nor is this all, for Mr. Selous is essentially of a generous nature, and it is but seldom that he returns from one of his sporting trips without some important addition accruing to the national museum.

In the volume now before us, the author gives an account of his experiences during several shooting trips to British North America, undertaken between the years 1900 and 1906 (inclusive) in search of moose, caribou, and wild sheep; these, which include two visits to Newfoundland, comprising the whole of his hunting in this portion of the New World. In the preface, Mr. Selous records his opinion with regard to the closure to the sportsman of the central districts of American Alaska—an opinion worth quoting, as it has a bearing on so-called game-preservation in other parts of the world. Although the sportsman, who would be content with a few good trophies of male animals to add to his collection, is completely shut out, the game is by no means protected. The Indians, for instance, armed with modern weapons, can apparently shoot as they will, and spare no animals of either sex or of whatever age which come in their way, while meat-hunters of European blood are no less destructive. Although the Indian doubtless has the justification that he shoots, in part, at any rate, for his own maintenance, yet it is he and his white fellow-countrymen who, in the author's opinion, will ultimately bring about the extermination of the game with which the land now abounds, unless the whole system of game legislature is altered, and that speedily.

<sup>1</sup> "Recent Hunting Trips in British North America." By F. C. Selous. Pp. 400; illustrated. (London: Witherby and Co., 1907.) Price 16s. net. "Game and Game Covers." By John Simpson. Pp. 83; 16 plates. (Sheffield: Pawson and Brailsford.) London: County Gentlemen's Association, Ltd., 1907. Price 15s.

"How to Fish: a Treatise on Trout and Trout-fishing." By W. E. Hodgson. Pp. xii+377. (London: A. and C. Black, 1907.) Price 3s. 6d. net.